

STRATEGIC WARNING

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The danger of counting on strategic warning has been widely acknowledged. In spite of this, some of our plans depend on it for their success. But planning on strategic warning is dangerous and this cannot be overemphasized. By their nature, indicators are ambiguous. Until an aggressor has irretrievably committed his forces to the attack, or has initiated some irrevocable attack warranting war as a response, the decision to make war can be reversed. Preparations can be abandoned, forces can be recalled. Therefore any prediction of an attack must of necessity be phrased in terms of probabilities. If we are to be realistic and accurate before the event, the most positive answer we can ever expect to the question, "Are the Soviets going to attack us?" is, "Perhaps." And the answers to the other important but vexing questions, "When?" and "Where?" will be even more uncertain.

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Despite this fundamental ambiguity of indications intelligence, we sometimes hear the argument that by some means we could have a near perfect ability to obtain strategic warning, now or in the future. Among other things, this argument ignores a problem fundamental to indication provided by a hostile opponent: namely, that the enemy can alter the relative clarity with which signals of his attack might stand out against the background of confusion and "noise" that is always present whether or not such an attack is brewing. The strength of the signals could always be reduced or possibly eliminated entirely by Soviet measures increasing internal security. The normal background noise that might obscure such signals will increase as the Soviets expand their strategic air-training operations with both manned bombers and missiles. For example, forward staging bases will be exercised, and long overwater refueled missions by the Long Range Air Force may become routine. Some forms of training may be adopted specifically to mask the signals that would be given by an actual attack. Both deliberate and undeliberate activity of this kind will degrade our indications system.

Of course, contrary to what we can reasonably expect, we might have indications of an impending Soviet planned "surprise" attack, and we might have these indications days before the scheduled "surprise." The

real question, however, is not only how early we will have these signals but how unambiguous they will be. We can state, unequivocally, that they will be equivocal. They might tell us a great deal, such as "A thermonuclear attack by the LRAF is probably imminent." On the other hand, they might tell us very little, such as "Something unusual is happening." This might mean there is an attack brewing. Or it might just mean that the Soviets are preparing for defense and counterattack in case the United States attacks them.

The ambiguity of strategic warning complicates the problem of decision. What actions are feasible on the basis of equivocal warning? They will depend on the degree of equivocality and on the probable frequency of false alarms. They will also depend on the gravity of the actions we might take, that is, on the cost of these actions to us. The decision to send our bombers on strike, or to launch our missiles, is the decision to wage World War III. As many studies of the problem of air defense of the United States have shown, this is very likely to involve enormous costs in terms of U.S. lives. We can hardly afford a mistaken reaction here. It should be plain, therefore, that we cannot plan on receiving strategic warning unequivocal enough to effect a U.S. war decision in advance of enemy attack.

How about less grave reactions—for example, alert preparations? Putting some forces on alert, or adding to forces already on alert, is not without costs. Today, both air and ground crews are painfully limited in number, and extending a combat alert can sacrifice training and future readiness. We should, of course, take advantage of whatever warning we can get, and later we shall discuss precisely this: the use of warning in a system of graded responses as a means of matching the seriousness of the reaction to the degree of unequivocality of warning. However, it is important to recognize that there is a problem of choice here. Before Pearl Harbor and before the fall of Singapore there were many "indicators," but none specific enough to make obvious this very choice between increasing future readiness and immediate protection. Finally, wherever an alert is critical for our survival it cannot be made to depend exclusively on the receipt of strategic warning.

If we were to alert the force *only* in response to warning, the force

might not be on combat alert when the enemy struck. An Intelligence estimate has credited the USSR with the ability to mount a 250-aircraft strike in 1955 without giving prior indications. Attacks with many fewer aircraft than this would be devastating. With the combat radii the enemy's planes will have later, he will be able to start unnoticed from deep inside his territory. By 1958, as he exercises his staging bases, the size of raid he will be able to mount through his peripheral bases without our receiving prior indications intelligence is estimated by Intelligence to be several times 250.

For deterrence, one last deficiency of intelligence warning would remain even if we could be sure of obtaining it. This deficiency is intrinsic to its covert nature. To deter the enemy we must make clear to him, as overtly as possible, that we will have enough warning to react to his attack. Deterrence, in Admiral Radford's phrase, must be visible.

DISTANT EARLY WARNING

In an attempt to obtain early tactical warning of an attack, we are building a radar line across the far north of the continent, and, recognizing that the continental portion of this line can easily be flanked, we are planning to extend the line out into the Atlantic and Pacific oceans (see Fig. 1, page 13). RAND has examined variants of the overwater sections of the DEW line, other than that shown in Fig. 1. In particular, we have studied attempts to counter the end-run problem by connecting the Atlantic line to Europe, or extensions of the Pacific line south from Midway. The Atlantic shift might be useful (if we neglect the spoofing problem discussed below), but the end-run problem in the Pacific is made very difficult, if not to all practical purposes unsolvable, by the extremely long range of the heavy turboprop Bear bomber. Both the Pacific and Atlantic lines are troubled by their proximity to Soviet territory.

Closeness of the line to Soviet-controlled territory affects the ease with which an overwater radar line can be spoofed. Routine training and weather missions can repeatedly cross such a line and, where it runs close to the Soviet Union, crossings can be made in force. With the AEW equipment we shall have in use for the next few years, our ability even

to detect penetrating aircraft will be small. Sea-clutter problems, and negligible high-altitude coverage by both AEW aircraft and picket ships, make it extremely dangerous to depend on this line for SAC survival, even neglecting the end-run problem. Many of these problems will be helped by the introduction of airborne ultra-high-frequency (UHF) radar and new radars on picket ships; but for the AEW aircraft, the spoofing problem may be worsened because of the inferior counting capability of this radar. Even a small number of Soviet aircraft could generate an intolerably high number of false alarms. Interference with Soviet mid-ocean flights would be in violation of international law and precedent, and would in any case require great effort. Suggestions that we declare war on the basis of such Pacific or Atlantic traffic patterns are simply unrealistic. Possible reprisals against our own overseas military traffic, including AEW planes, make even the shooting down of intruders extremely hazardous. Finally, even if we believed this policy to be a good one, we could hardly rely on the U.S. Government's adopting this view, say, in 1961.

Our present plans for siting new SAC bases and continental radars assume that the enemy cannot skirt the Distant Early Warning lines; so also do some of our plans for using AEW aircraft off the coasts of the United States and in defense of task forces. But he will be able to do so—and if he should plan an attack, it would be a sensible thing for him to do.

DESIGN OF SENSIBLE ENEMY ATTACKS

If the enemy is intelligent in designing his strikes—and, in our planning, we must assume that he may be—he will do SAC as much harm as he can. To achieve that objective he will exploit the known limitations of our defenses. Therefore, his attacks are not to be judged apart from our defense posture.

Our SAC presents soft, relatively few, relatively undefended targets. Our warning system has large holes. Except under conditions of alert, SAC response to warning is slow, even for evacuation. And SAC's ability to recover evacuated elements and to strike is limited, untried, and can be denied by a follow-up raid.

Until these major weaknesses in our defense posture have been eliminated, neither advanced Soviet weapon systems nor devious modes employing the present ones are necessary. Even rather straightforward attacks will neutralize SAC. However, this does not mean that we rest after we have reduced or eliminated our vulnerability to just the conventional attacks.

The enemy needs to limit warning if we can use it. Attacking or defending a strategic force is radically different from attacking or defending cities. The significant difference is that the strategic force may not be there when the attack arrives.

Against a moderately alert and fast-reacting SAC, an intelligent enemy must seek to reduce warning. He must not give us enough warning to enable us to mount a strike—even if this means limiting the lethality of his first raid.

A follow-up raid may be necessary. If he doesn't kill our aircraft and crews, but disrupts our strike response, a follow-up raid can still do us the possibility of recovery and retaliation.

This is what is *sensible* for him to do. What *can* he do?

ENEMY CAPABILITIES BY 1960-1961

1961-58 MT Intelligence estimates indicate that the Soviets will have a 3000 high-yield bomb in 1960. Its yield of about 1-MT will give a destructive radius of over 4 nautical miles against unprotected bombers. From Bull's 2000-nautical-mile radius, the Soviets have progressed to a 1961 Bear, which, with a 3000-lb weapon, has a 4100-nautical-mile radius and a refueled radius of 5350 nautical miles. Assuming engine and gross takeoff weight improvements of the same order as those regularly experienced with our own bombers, the 1960 Bear, carrying a 3000-lb weapon, is credited with a once-refueled radius of about 6200 nautical miles—a range of about 12,400 nautical miles—enough to go half way around the earth. It is not necessary, then, to talk of improvements in aircraft state of the art that are expected in the sixties—high-energy fuels, boundary layer control, and nuclear power.

With this range capability, the Bear will be able to end-run the DE

line and attack the United States from the south. Figure 5 shows that it can go to Omaha by way of Mexico and all the way home by a more direct route with over 2000 nautical miles of range to spare. This extra range can be traded for extreme high- or low-altitude penetrations, or

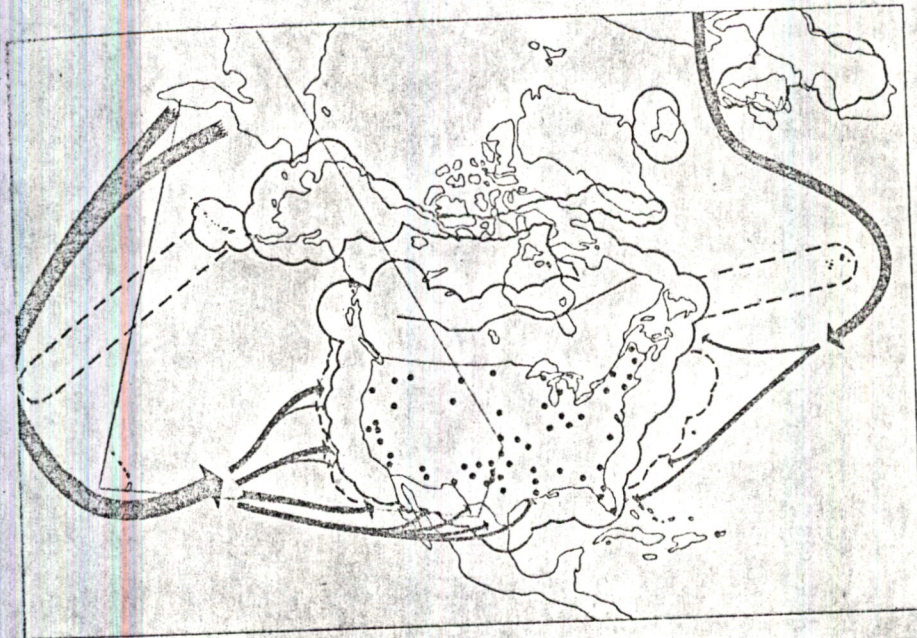


Fig. 5—Projected 1961 distant and continental early warning lines (high altitude)—end-run attack

for the use of takeoff bases deep in the interior of the Soviet Union. Moreover, if desired, even East Coast SAC bases can be attacked from the Pacific—around the end of the DEW line easiest to skirt. In any case, because these routes offer the most favorable winds, and because of the proximity of the Kamchatka peninsula, most ZI bases are best attacked via Pacific routes. In sum, the extended range of Russian bombers will make available to them just about any useful route and profile of attack.

An attack giving even more limited warning is possible with the ICBM. The Directorate of Intelligence, HqUSAF, has estimated that the Soviets will have an intercontinental ballistic missile in series production by 1960

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or 1961. This early weapon may have a 3000-lb warhead, about 5500-nautical-mile range, and may be delivered at that range with an equivalent circular probable error perhaps as low as 2 nautical miles, but more likely 5 nautical miles or greater. Its use at shorter ranges offers the alternatives of reducing the CEP, increasing warhead weight, or choosing flat trajectories. The 3000-lb warhead has been assumed in this study to produce a yield of 1 MT by 1960.

RESULTS OF SOME LIMITED WARNING ATTACKS

A study of the contribution of other U.S. forces possessing some atomic retaliatory power indicates that they are all highly vulnerable to atomic attack. Overseas SAC, tactical, and naval forces having an atomic capability are concentrated at a few points, easily found and easily destroyed. The full report on our previous study (R-266) has shown in detail the vulnerability of land-based units overseas. The present study shows that the vulnerability of overseas forces is not confined to those based on land. Carrier-based aircraft within striking distance of the Soviets cannot expect to survive a surprise attack or post-D-day attacks with more success than ground-based aircraft. The key problem of all the forces overseas is the extreme limitation on the amounts of warning available to them. However, consider attacks with either the Bear or ICBM, designed to limit warning to continental U.S. SAC bases. The situation of SAC inside the U.S. continental radars might at first appear considerably better.

The dotted bars of Fig. 2 (page 14) show the times from first penetration of the ZI radars to bomb release over SAC bases that result when the enemy uses the range of the Bear to avoid detection at the DEW line. Over half of our bases get less than an hour's warning. Figure 1 shows that slightly more than 30 per cent of the bombers survive if there is no alert, and only a few per cent get off combat ready. If as much as one-third of SAC is on alert, the survival of this part depends directly on its launch time. If it is on a 1-hour alert, at most 15 per cent of the force survives combat ready. If the response time for the alert portion of SAC is as short as 15 minutes, almost all of the alert force survives.

but the remaining two-thirds is almost totally destroyed. In any case, most of the vital personnel are lost, and only about 10 per cent of the other critical elements survive. In particular, our stockpiles of bomb assemblies are almost all damaged or destroyed.

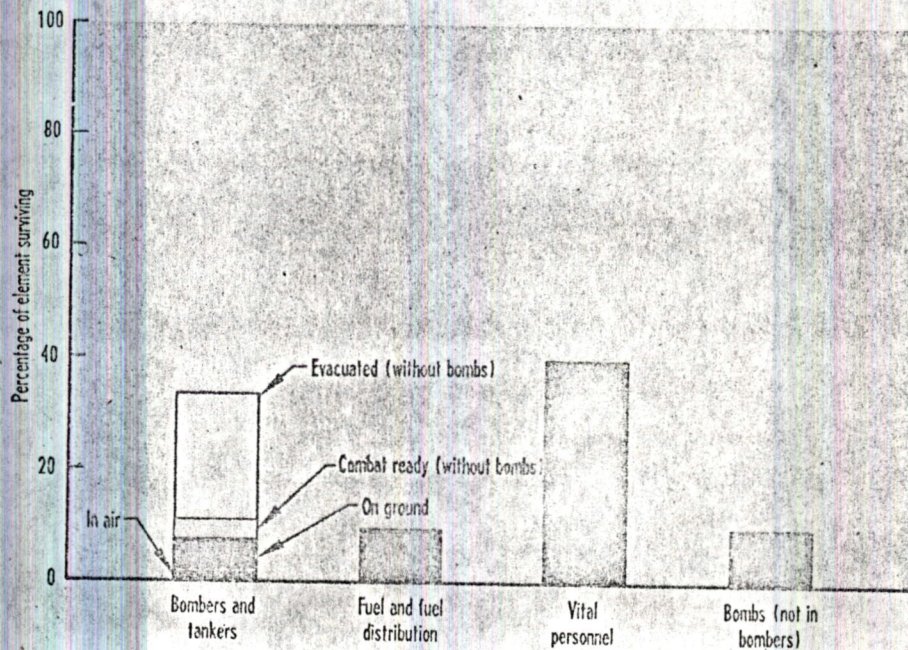


Fig. 6—Vulnerability of SAC to an attack by 300 Bears with 1-MT bombs (DEW line avoided) 192

4 Unless a very advanced degree of alertness is achieved for a very considerable part of SAC, vehicles such as the ICBM will not be needed by the enemy. On the other hand, if he does need them, he will find them sufficient. Figure 7 shows the results of a closely coordinated 1961 Soviet attack with 250 ICBM's against a SAC force, assuming the 15-minute alert. This is a missile with a CEP of 5 nautical miles and a 1-MT warhead. Even if somewhat less than half of these missiles are successfully launched and do not abort, we suffer damage to about 70 per cent of our bombers and tankers, and to almost the same percentage of the vital personnel. Other, tougher, elements fare considerably better. The lethality

of this weapon, even with its poor accuracy, against such soft targets, aircraft should be emphasized. Its lethal radius in terms of damage that would prevent use of the B-47 and B-52, at least until they were repaired, is about $4\frac{1}{2}$ nautical miles (at a 12,000-ft burst height). Each missile that lands in the target area has about a 40 per cent chance of damaging the parked aircraft.

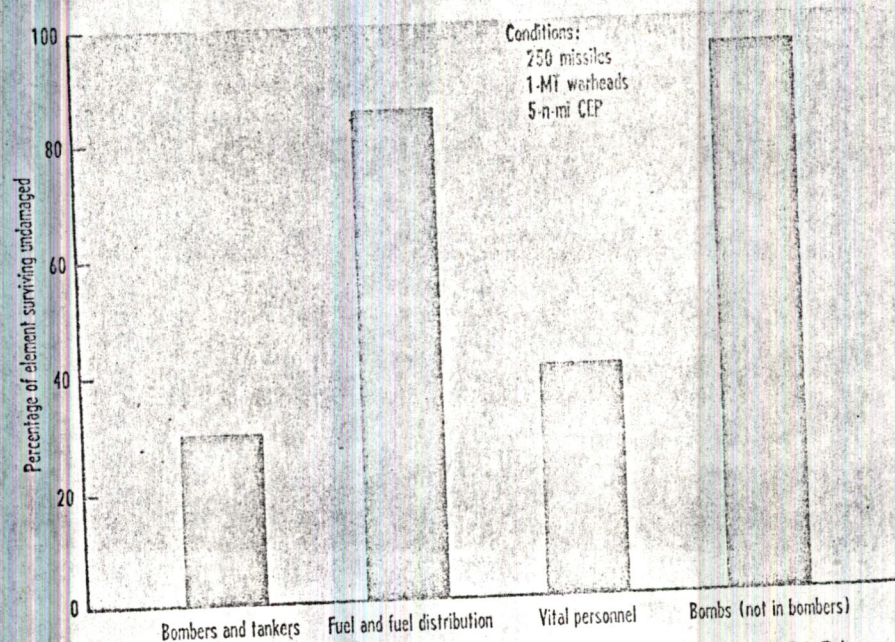


Fig. 7—Survival of SAC elements after an ICBM attack against SAC bases in 1961

Figure 7 shows that neither a large missile force nor very advanced missile performance is necessary to hurt SAC seriously. Figure 8 shows the vulnerability of SAC to three possible enemy ICBM's. With the expected early threat, already shown in Fig. 7—a Soviet ICBM with a 1-MT warhead and a CEP of 5 nautical miles—a force of 200 to 300 missiles can destroy and damage most of SAC's bombers and tankers. Better missiles, available later with better accuracy and larger warheads, possibly the same 5500-nautical-mile-range vehicle used at shorter range,

from Eastern Siberia) will be capable of destroying almost all of SAC with a salvo capability of *fewer than 100 missiles*.

These attacks are by no means the best the enemy could design; nor do they use mixed forces, as they might be expected to do. However, they do show that our planned defense posture makes a follow-up raid redundant—except as a form of insurance.

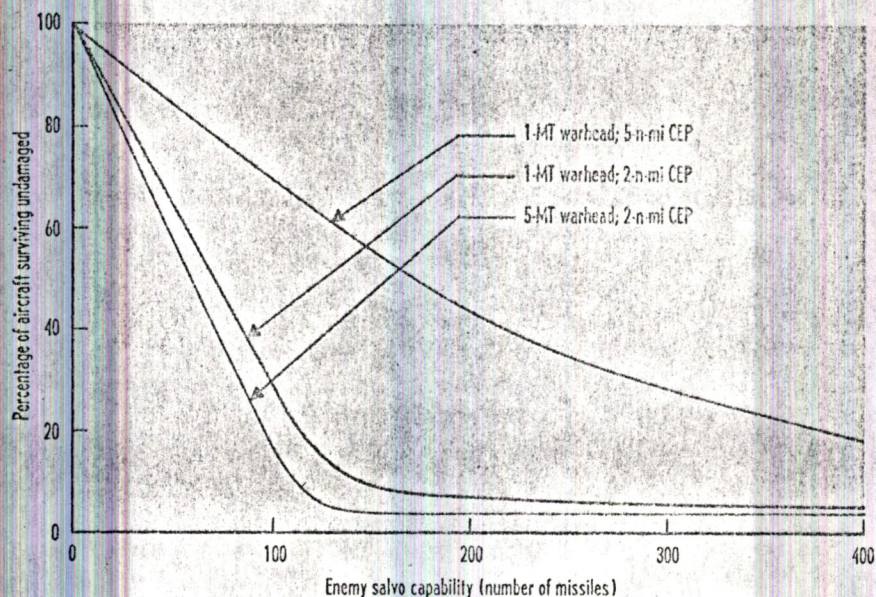


Fig. 8—Vulnerability of Programmed SAC to enemy ballistic missiles

In the 1960–1961 time period we are scheduled to start phasing ICBM's into the strategic force. Before that time, in 1959, there are plans for putting Intermediate-Range Ballistic Missiles overseas. How will these missiles change things? It is sometimes assumed that they will solve all problems—in particular, that they are intrinsically invulnerable on the ground. This is not true. The vulnerability of these missiles will be what we make it in the design of the missile system. These missiles could be more vulnerable than manned bombers if their basing were too concentrated, if they were too soft and responded too slowly.

If the initial 1960-1961 force of 120 ICBM's is not sheltered, the Soviet force needed to destroy it may be small. For example, if this force is based in three large complexes, one of which is shown schematically in Fig. 9, and if it is not sheltered, then the Soviet force able to destroy an expected 80 per cent of it need only be 24 missiles, allowing for unavailability and aborts. Alternatively, the penetration of only 12 manned bombers would destroy all of this force, and this number of bombers could be reduced by one-half or more if the Russians put more than one bomber in each bomber. The small enemy force needed in spite of the apparent

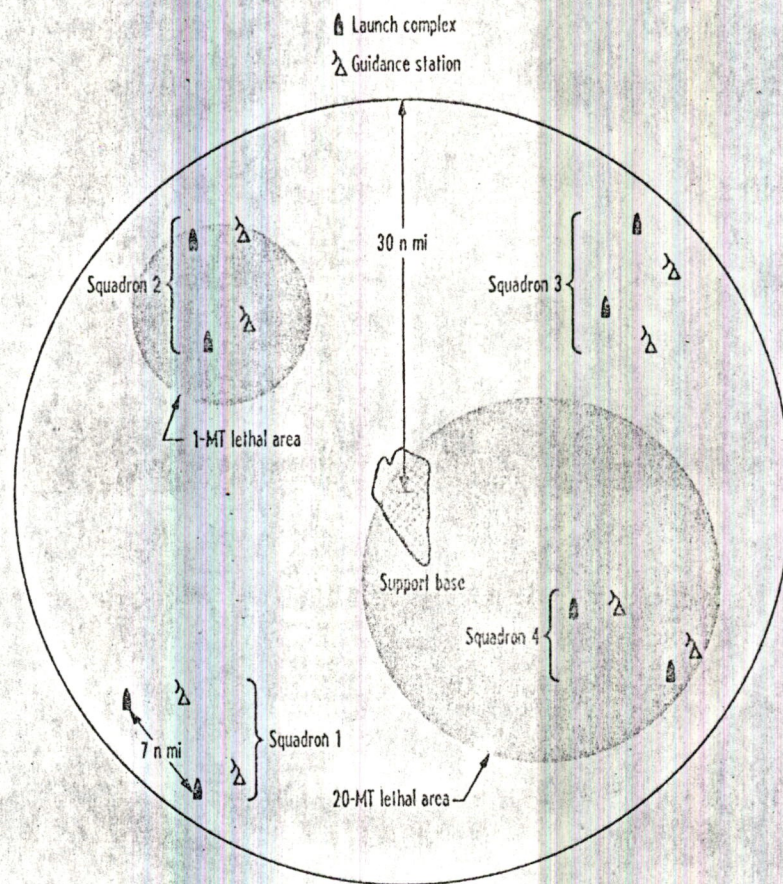


Fig. 9—Layout of an ICBM (SM-65) provisional group, and lethal areas of thermonuclear weapons against unsheltered missiles